

THAT WHICH IS CLAIMED:

1 A method for producing microfilaments, comprising:

extruding a plurality of multicomponent fibers comprising at least one polymer component comprising an elastomeric polymer and at least one polymer component comprising a non-elastomeric polymer, wherein said elastomeric polymer has a solubility parameter ( $\delta$ ) sufficiently different from said non-elastomeric polymer so that said elastomeric component and said non-elastomeric component split upon thermal treatment;

10 drawing said multicomponent fibers to plastically deform said non-elastomeric component so that said non-elastomeric component maintains substantially its same length after drawing upon release of drawing tension and to elastically deform said elastomeric component so that said elastomeric component is capable of substantially complete recovery to its original length upon release of drawing tension and release of adhesion to the non-elastomeric component; and

15 thermally treating said drawn multicomponent fibers under conditions of low or substantially no tension to separate said multicomponent fibers to form a fiber bundle comprising a plurality of elastomeric microfilaments and a plurality of non-elastomeric microfilaments which are more bulked than said elastomeric microfilaments.

2. The method of Claim 1, wherein said thermally treating step comprises thermally treating said fibers at a temperature of at least about 35°C.

20 3. The method of Claim 2, wherein said thermally treating step comprises contacting said fibers with a heated gaseous medium.

4. The method of Claim 3, wherein said heated gaseous medium comprises heated air substantially free of water.

25 5. The method of Claim 1, wherein said method further comprises texturizing said fibers by directing said fibers through a texturing jet.

6. The method of Claim 5, wherein said texturizing step comprises contacting said fibers with a heated jet air stream in said texturizing jet, and wherein said thermally treating step and said texturizing step occur simultaneously.

7. The method of Claim 5, wherein said thermally treating step occurs before said texturizing step.

8. The method of Claim 1, wherein said elastomeric microfilaments are substantially non-bulked.

9. The method of Claim 1, wherein said non-elastomeric microfilaments substantially surround said elastomeric microfilaments and wherein each of said non-elastomeric microfilaments has a random series of substantially non-linear configurations.

10. The method of Claim 1, wherein said elastomeric polymer is selected from the group consisting of polyurethane elastomers, ethylene-polybutylene copolymers, poly(ethylene-butylene)polystyrene block copolymers, polyadipate esters, polyester elastomeric polymers, polyamide elastomeric polymers, polyetherester elastomeric polymers, ABA triblock or radial block copolymers, and mixtures thereof.

11. The method of Claim 10, wherein said elastomeric polymer is polyurethane.

12. The method of Claim 1, wherein said non-elastomeric polymer is selected from the group consisting of polyolefins, polyesters, polyamides, and copolymers and mixtures thereof.

13. The method of Claim 12, wherein said non-elastomeric polymer is a polyolefin.

14. The method of Claim 13, wherein said polyolefin is polypropylene.

15. A method for producing microfilaments, comprising:

extruding a plurality of multicomponent fibers comprising at least one elastomeric polyurethane component and at least one non-elastomeric polypropylene component;

drawing said multicomponent fibers to plastically deform said non-elastomeric polypropylene component so that said non-elastomeric polypropylene component maintains substantially its same length after drawing upon release of drawing tension and to elastically deform said elastomeric polyurethane component so that said elastomeric polyurethane component is capable of substantially complete recovery to its original length upon release of drawing tension and release of adhesion to the non-elastomeric component; and

contacting said drawn multicomponent fibers with heated air under conditions of low or substantially no tension to separate said multicomponent fibers to form a fiber bundle comprising a plurality of elastomeric polyurethane microfilaments and non-elastomeric polypropylene microfilaments, wherein said polypropylene microfilaments are more bulked than said polyurethane microfilaments, and wherein said polypropylene microfilaments substantially surround said polyurethane microfilaments.

16. A method for producing microfilaments, comprising:

extruding a plurality of multicomponent fibers comprising at least one polymer component comprising an elastomeric polymer and at least one polymer component comprising a non-elastomeric polymer, wherein said elastomeric polymer has a solubility parameter ( $\delta$ ) sufficiently different from said non-elastomeric polymer so that said elastomeric component and said non-elastomeric component split upon thermal treatment;

drawing said multicomponent fibers to plastically deform said non-elastomeric component so that said non-elastomeric component maintains substantially its same length after drawing upon release of drawing tension and to elastically deform said elastomeric component so that said elastomeric component is capable of substantially complete recovery to its original length upon release of drawing tension and release of adhesion to the non-elastomeric component; and

contacting said multicomponent fibers with a heated substantially water free medium under conditions of low or substantially no tension to separate said

multicomponent fibers to form a fiber bundle comprising a plurality of elastomeric microfilaments and a plurality of non-elastomeric microfilaments.

5 17. A fiber bundle comprising a plurality of elastomeric microfilaments and a plurality of plastically deformed non-elastomeric microfilaments which are more bulked than said elastomeric microfilaments, said microfilaments originating from a common multicomponent fiber having elastomeric and non-elastomeric components, wherein said elastomeric polymer has a solubility parameter ( $\delta$ ) sufficiently different from said non-elastomeric polymer so that said elastomeric component and said non-elastomeric component split upon thermal activation.

10 18. The fiber bundle of Claim 17, wherein said elastomeric polymer and said non-elastomeric polymer have a difference in solubility parameters ( $\delta$ ) of at least about  $1.2 \text{ (J/cm}^3)^{1/2}$ .

15 19. The fiber bundle of Claim 18, wherein said elastomeric polymer and said non-elastomeric polymer have a difference in solubility parameters ( $\delta$ ) of at least about  $2.9 \text{ (J/cm}^3)^{1/2}$ .

20. The fiber bundle of Claim 17, wherein each of said non-elastomeric microfilaments has a random series of substantially non-linear configurations.

21. The fiber bundle of Claim 17, wherein said elastomeric microfilaments are substantially non-bulked.

20 22. The fiber bundle of Claim 17, wherein said non-elastomeric microfilaments substantially surround said elastomeric microfilaments.

23. The fiber bundle of Claim 17, wherein said microfilaments have an average size ranging from about 0.05 to about 1.5 denier.

25 24. The fiber bundle of Claim 17, wherein said fiber bundle comprises about 8 to about 48 microfilaments.

25. The fiber bundle of Claim 17, wherein said fiber bundle is in the form of staple fiber.

~~26. A yarn comprising the fiber bundle of Claim 17.~~

27. The yarn of Claim 26, wherein said non-elastomeric microfilaments and said elastomeric microfilaments are different colors, and wherein said yarn has a first color in its unstretched condition and a different color in its stretched condition.

28. A fiber bundle comprising a plurality of elastomeric polyurethane microfilaments and a plurality of plastically deformed non-elastomeric polypropylene microfilaments which are more bulked than said elastomeric microfilaments substantially surrounding said elastomeric polyurethane microfilaments, said microfilaments originating from a common multicomponent fiber having elastomeric polyurethane and non-elastomeric polypropylene components which split upon thermal activation.

~~29. A yarn comprising the fiber bundle of Claim 28.~~

30. A fabric comprising a plurality of elastomeric microfilaments and a plurality of plastically deformed non-elastomeric microfilaments which are more bulked than said elastomeric microfilaments, said microfilaments originating from a common multicomponent fiber having elastomeric and non-elastomeric components, wherein said elastomeric polymer has a solubility parameter ( $\delta$ ) sufficiently different from said non-elastomeric polymer so that said elastomeric component and said non-elastomeric component split upon thermal activation.

31. The fabric of Claim 30, wherein said fabric is selected from the group consisting of nonwoven fabrics, woven fabrics, and knit fabrics.

32. A product comprising the fabric of Claim 29, selected from the group consisting of synthetic suede and filtration media.

33. The product of Claim 32, wherein said product is synthetic suede.

34. A method for producing fabric, said method comprising:

extruding a plurality of multicomponent fibers comprising at least one polymer component comprising an elastomeric polymer and at least one polymer component comprising a non-elastomeric polymer, wherein said elastomeric polymer has a solubility parameter ( $\delta$ ) sufficiently different from said non-elastomeric polymer so that said elastomeric component and said non-elastomeric component split upon thermal activation;

drawing said multicomponent fibers to plastically deform said non-elastomeric component so that said non-elastomeric component maintains substantially its same length after drawing upon release of drawing tension and to elastically deform said elastomeric component so that said elastomeric component is capable of substantially complete recovery to its original length upon release of drawing tension and release of adhesion to the non-elastomeric component;

forming a fabric from said multicomponent fibers; and

thermally treating said drawn multicomponent fibers under conditions of low or substantially no tension to separate said multicomponent fibers to form a fiber bundle comprising a plurality of elastomeric microfilaments and a plurality of non-elastomeric microfilaments which are more bulked than said elastomeric microfilaments.

35. The method of Claim 34, wherein said thermal treatment step comprises thermally treating said fibers at a temperature of at least about 35°C.

36. The method of Claim 35, wherein said thermal treatment step comprises contacting said fibers with a heated gaseous medium.

37. The method of Claim 36, wherein said heated gaseous medium comprises heated air substantially free of water.

38. The method of Claim 34, wherein said elastomeric microfilaments are substantially non-bulked.

39. The method of Claim 34, wherein said non-elastomeric microfilaments substantially surround said elastomeric microfilaments.

40. The method of Claim 39, wherein the step of forming a fabric comprises forming a woven fabric, forming a knit fabric, or forming a nonwoven fabric.

41. The method of Claim 40, wherein the step of forming a fabric comprises the steps of forming a nonwoven web of said multicomponent fibers and bonding said web of multicomponent fibers to form a unitary nonwoven fabric.

42. The method of Claim 34, wherein said thermal treatment step occurs simultaneously with said fabric forming step.

43. The method of Claim 34 wherein said thermal treatment step occurs prior to said fabric forming step.

44. The method of Claim 43, wherein said method further comprises texturizing said fibers by directing said fibers through a texturing jet to form a yarn prior to said fabric formation step.

45. The method of Claim 44, wherein said texturizing step comprises contacting said fibers with a heated jet air stream in said texturizing jet, and wherein said thermal treatment step and said texturizing step occur simultaneously.

46. The method of Claim 44, wherein said thermal treatment step occurs before said texturizing step.

47. The method of Claim 34, wherein said thermal treatment step occurs after said fabric forming step.

48. A splittable multicomponent fiber comprising:

at least one component comprising an elastomeric polymer, which is elastically deformed so that said elastomeric component is capable of substantially complete recovery to its original length upon release of drawing tension; and

at least one component comprising a non-elastomeric polymer, which is plastically deformed so that said non-elastomeric component maintains substantially its same length after drawing upon release of drawing tension,

wherein said elastomeric polymer has a solubility parameter ( $\delta$ ) sufficiently different from said non-elastomeric polymer so that said elastomeric component and said non-elastomeric component split upon thermal treatment.

49. The fiber of Claim 48, wherein said elastomeric polymer and said non-elastomeric polymer have a difference in solubility parameters ( $\delta$ ) of at least about 1.2 ( $\text{J}/\text{cm}^3$ )<sup>1/2</sup>.

50. The fiber of Claim 49, wherein said elastomeric polymer and said non-elastomeric polymer have a difference in solubility parameters ( $\delta$ ) of at least about 2.9 ( $\text{J}/\text{cm}^3$ )<sup>1/2</sup>.

51. The fiber of Claim 48, wherein said elastomeric polymer is selected from the group consisting of polyurethane elastomers, ethylene-polybutylene copolymers, poly(ethylene-butylene)polystyrene block copolymers, polyadipate esters, polyester elastomeric polymers, polyamide elastomeric polymers, polyetherester elastomeric polymers, ABA triblock or radial block copolymers, and mixtures thereof.

52. The fiber of Claim 51, wherein said elastomeric polymer is polyurethane.

53. The fiber of Claim 48, wherein said non-elastomeric polymer is selected from the group consisting of polyolefins, polyesters, polyamides, and copolymers and mixtures thereof.

54. The fiber of Claim 53, wherein said non-elastomeric polymer is a polyolefin.

55. The fiber of Claim 54, wherein said polyolefin is polypropylene.

~~56. The fiber of Claim 48, wherein said fiber is selected from the group consisting of pie/wedge fibers, segmented round fibers, segmented oval fibers, segmented rectangular fibers, and segmented ribbon fibers.~~



57. The fiber of Claim 48, wherein the weight ratio of said elastomeric polymer component to said non-elastomeric polymer component ranges from about 80/20 to about 20/80.

58. The fiber of Claim 48, wherein said fiber is selected from the group consisting of continuous filaments and staple fibers.

59. A fabric comprising a plurality of splittable multicomponent fibers comprising at least one polymer component comprising a non-elastomeric polymer which is plastically deformed so that said non-elastomeric component maintains substantially its same length after drawing upon release of drawing tension and at least one polymer component comprising an elastomeric polymer which is elastically deformed so that said elastomeric component is capable of substantially complete recovery to its original length upon release of drawing tension and release of adhesion to the non-elastomeric component; wherein said elastomeric polymer has a solubility parameter ( $\delta$ ) sufficiently different from said non-elastomeric polymer so that said elastomeric component and said non-elastomeric component split upon thermal activation.

60. A method for producing splittable multicomponent fibers, said method comprising:

extruding a plurality of multicomponent fibers comprising at least one polymer component comprising an elastomeric polymer and at least one polymer component comprising a non-elastomeric polymer, wherein said elastomeric polymer has a solubility parameter ( $\delta$ ) sufficiently different from said non-elastomeric polymer so that said elastomeric component and said non-elastomeric component split upon thermal activation; and

drawing said multicomponent fibers to plastically deform said non-elastomeric components and elastically deform said elastomeric components so that said elastomeric component is capable of substantially complete recovery to its original length upon release of drawing tension and release of adhesion to the non-elastomeric component.

61. A method for producing fabric, said method comprising:

extruding a plurality of multicomponent fibers comprising at least one polymer component comprising an elastomeric polymer and at least one polymer component comprising a non-elastomeric polymer, wherein said elastomeric polymer has a solubility parameter ( $\delta$ ) sufficiently different from said non-elastomeric polymer so that said elastomeric component and said non-elastomeric component split upon mechanical fabric formation;

drawing said multicomponent fibers to plastically deform said non-elastomeric component so that said non-elastomeric component maintains substantially its same length after drawing upon release of drawing tension and to elastically deform said elastomeric component so that said elastomeric component is capable of substantially complete recovery to its original length upon release of drawing tension and release of adhesion to the non-elastomeric component;

forming a web of said multicomponent fibers; and

mechanically treating said web under conditions sufficient to intimately entangle said multicomponent fibers and to separate said multicomponent fibers to form fiber bundles comprising a plurality of elastomeric microfilaments and a plurality of non-elastomeric microfilaments which are more bulked than said elastomeric microfilaments.

62. The method of Claim 61, wherein said mechanically treating step comprises hydroentangling or needlepunching said web.